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THE PRESERVATION OF FOODS

CANNING AND DRYING OF FRUITS AND VEGETABLES

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CANNING AND DRYING

METHODS OF FOOD PRESERVATION

The home preservation of food for future use can be done in two ways—canning and drying. Canning is the method by which various foods are preserved in containers by sterilization and air-tight sealing. Drying is the method of food preservation whereby all the moisture contained therein is evaporated. The bacterial organisms which spoils foods must have moisture for their growth. By the exudation of the moisture, their development is prevented.

Drying is the oldest method of food preservation known, but has fallen into disuse of late years, so we will deal first, with the more widely used method of food preservation—canning.

CANNING

Canning, too, is very old. The early Chinese possessed this secret long before the era of modern civilization, but the "reason why" which lay back of the art have only recently been explained. The great secret of canning or preserving lies in complete sterilization. The micro-organisms which are present in the air and in all substances, and are the causes of rotting or decomposition, must first be destroyed by heat, and then completely excluded by sealing, that they can not renew their attempts to destroy the food.

There are two household methods of canning—the open kettle and the cold pack method. In the former, the material to be canned is completely cooked before it is put into the jar. In the latter and newer method the material is cold packed, or placed in the jar while cold, and then cooked and sterilized. The advantages of the cold pack method over the open kettle method are: (1) it is adapted to all fruits and vegetables; (2) it saves time and labor; and (3) it produces a more uniform product with better color, better flavor, and better shape. Also it prevents the possibility of any of the micro-organisms attacking the food while it is being transferred from the kettle to the jars or while the jars, tops and rubbers are waiting to be adjusted.

CANNERS OR CANNING OUTFITS

There are various outfits for canning on the market: Hot water bath canners, water seal outfits and steam pressure canners. Effective canners need not be purchased, however, but can be made of a wash-boiler, a lard pail or a bucket—any large container that possesses a tight lid. Of them all, the wash-boiler is perhaps the best, for it will hold more jars, with less loss of heat than any of the other containers. The boiler must be equipped with some sort of false bottom, of heavy wire gauze or of strips of wood nailed together. This rack is to protect the jars from direct contact with the heat, and also to permit a free circulation of the water around and under the containers. If the rack is equipped with some sort of handles, the lifting of the jars out of the boiling water is made easy.

CONTAINERS

Tin cans are largely used by the commercial packers, but most housewives prefer the glass jars. They are more attractive in appearance, last longer and are easier to seal. There are many kinds of glass jars on the market. Perhaps the most satisfactory is the type that has a glass top held in place by a wire clamp. In all makes of jars, choose the wide-mouth kind, if obtainable. Provided, that the jars are of good quality glass, smooth and well finished, any make will do the work quite satisfactorily. More important than the jar itself is the method by which it is sealed. The top, therefore, is the important consideration.

The screw tops should never be used the second year, if they are discolored, corroded or bent on the edge. An old top which has been removed by prying up the edge with a knife should be discarded, as the edge cannot be pounded into shape successfully. Jar tops may be removed without injury by inverting the jar a few moments in very hot water, or by pulling the rubber out from under the top. Both old and new tops should be tested carefully before the jars are filled. To test the screw tops, adjust them on the jars without the rubber, screw down tight, and run the thumb nail between the top and the glass. If the thumb nail slips under the edge, it shows that the top does not fit the jar and that it is unsafe to use.

When using jars with glass tops and metal clasps, be certain that the springs and clasps are tight and strong. The wire clamp placed over the top of the cover should go on with a snap, even when the tightening lever or clamp spring is up. If it does not, remove the top clamp from the tightening lever and bend to make tight. This should be done each year.

For some types of jars, new composition tops are needed each year.

RUBBERS

Always buy good, thick, heavy jar rubbers that will stand several hours in boiling water without being injured. Never use singly the rubbers left over from the last year. It is better not to use the rubbers that come with the jars, for they are usually thin and of poor quality. The writer has used these rubbers on the jars, but has always put them on top of an old rubber of good quality, using two on each jar. It is better, however, not to economize in this fashion. It is cheaper to buy thick, new rubbers and even jar tops than to take the risk of losing an occasional jar of fruit or vegetables.

OTHER NECESSITIES

A measuring cup, a teaspoon, a tablespoon, a fork, a paring knife, and a cloth for blanching and cold dipping are the absolute essentials for use. A wide mouthed funnel or jar filler is next in necessity, then an apple corer, a jar lifter, a peeler with protected blade, a wire basket, a wooden spoon, a spatula and a set of measuring spoons.

PREPARATIONS

Those engaged in the work should have clean hands, clean utensils, clean, sound, fresh products, and pure, clean, soft water. The room should have been well swept and dusted. All utensils should be washed and then dipped into boiling water. The jars and tops should be washed clean and then placed in a pan of cold water over the fire until the water boils for several minutes. The pan can then be stood aside where the water will keep hot, until ready for the filling. If the jars are filled with water and then rapidly inverted in the pan at the start, you will find them easier to lift out of the hot water, with no danger of contamination from the micro-organisms of decay.

Fruit and vegetables should be "put up" as soon as possible, the same day they are picked if it can be so managed. Peas and corn, which lose their flavor rapidly, should be canned, in fact within five hours, if a choice product is desired. No withered or unsound fruits or vegetables should be canned. All products should be graded for ripeness. Large fruits and vegetables should be pared if necessary, and small fruits, berries, and greens picked over carefully. All grit and dirt should be washed carefully from the materials to be used. Special care should be taken in canning peas, beans, corn and asparagus, as they are likely to acquire a disagreeable flavor known as "flat sour" in a very short time. This condition does not cause the food to spoil but destroys its palatability.

STEPS IN CANNING

After the materials have been cleaned and put into the shape in which they are to be canned, and containers have been cleaned and tested, we are now ready to proceed with the actual canning. The procedure for most products by the one-period cold-pack method consists of five steps—scalding, or blanching, cold-dipping, packing, processing, and sealing. In canning berries and all soft fruits the blanching is dispensed with. These include cherries, blackberries, blueberries, huckleberries, dewberries, gooseberries, raspberries, strawberries, currants, figs, grapes, apricots, peaches and plums.

Other fruits and nearly all the vegetables are blanched or scalded by being placed in a cheesecloth bag or wire dipping basket into boiling water and allowed to remain there from 1 to 15 minutes depending on the kind of product. In the cases of greens and green vegetables, however the scalding is accomplished most satisfactorily in steam, as volatile oils and other substances remain in the food under this treatment. Such products may be put into a colander, set over a vessel of boiling water and covered as tightly as possible. Better results may be obtained, however, by the use of a steam cooker.

As soon as the product is removed from the boiling water or steam it should be dipped into cold, clean water and immediately removed and drained for a few moments. The temperature of the water used for cold dipping should be as low as possible.

Blanching and cold dipping are advised in the case of fruits and vegetables, except the soft fruits, because it (a) loosens the skins, (b) shrinks the product, enabling more to be packed into the jar, and (c) aids in preserving color and shape.

The product should then be packed carefully into hot jars. Boiling hot syrup or hot water is poured over fruits. In case of vegetables, hot water is usually used and salt is added for seasoning. In filling the jars with boiling water or syrup the use of a small funnel will help to prevent breaking the jars. The scalded rubbers and tops of jars are put into place, the tops screwed tight, then turn back one half a turn to loosen. If glass tops with wire clamps are used, the top bail is put in place, but the tightening clamp is not sprung down. The jars are then placed into the boiler or other large container for processing.

Processing is the final application of heat to sterilize the product and is continued for a period determined by the character of the product and the size of the jars. The time given in the directions is for quart jars. Deduct ten per cent. for pint jars, and add ten per cent. for half-gallon jars. In all cases count time from the time the water boils, and keep the water boiling all the time. Water should come within 1 inch of rubbers. The lid of the wash boiler or other utensil used for processing or sterilizing should fit very tightly. If possible it should be lined with a towel or newspapers to keep in the steam. Each jar should be placed in the processing vessel as soon as it is filled. Do not forget the wooden or wire rack in the bottom of the sterilizing vessel.

Immediately after the termination of the processing period while the products are still hot, tighten tops immediately and set away from drafts to cool. If the bottom rack is equipped with handles the jars may all be lifted out quickly and easily. Screw tops should be turned as far as possible, or the spring clamps snapped down. Be careful of drafts which will crack the jars. The jars should be placed upside down on trays and closely examined for leaks. If leakage occurs, the covers should be tightened until they are completely closed. If it is necessary to remove tops, the jars must again be sterilized for twenty minutes.

When the jars are completely cool, they should be stored in a cool, dry place not exposed to freezing temperatures. Most products packed in glass jars will bleach or darken if exposed to the light. It is well, therefore, to wrap them in paper. From time to time, especially in hot weather they should be examined to make certain there are no leaks, swelling of the tops or other sign of fermentation.

DIRECTIONS FOR FRUITS

Sirups

Sirups are employed usually in canning fruits.

There is no set rule for making sirup. It is not necessary to use sirup in canned fruits unless desired. The amount of sugar used in the sirup will depend upon the individual taste. However, the ideal product should have enough to improve the flavor and not

enough to cover up the natural flavor of the fruit. Too thick a sirup destroys the value of the canned product as a partial substitute for fresh fruit in the diet.

Thin sirups are used for all sweet fruits such as cherries, peaches, apples, etc., that are not too delicate in texture and color. Medium-thin sirups are used in the canning of the medium-sweet fruits, such as blackberries, currants, dewberries, huckleberries, raspberries, etc. Medium-thick sirups the used in the canning of all sour fruits, such as gooseberries, apricots, sour apples, etc., and delicately colored fruits, such as strawberries and red raspberries. Thick sirup is used in preserving and making all kinds of sun-cooked preserves.

How to Determine Sirup Density

Unsatisfactory results frequently follow the use of sirups which are not of the density best suited to the particular purpose for which they are employed. The following table gives the proportions of sugar and water required to prepare sirup of the desired density. No allowance has been made for evaporation during heating

PROPORTIONS OF SUGAR AND WATER OF SIRUP OF DIFFERENT DENSITY

Desired sirup density.	Sugar.	Water.	Desired sirup density.	Sugar.	Water.
Per cent.	Pounds.	Quarts.	Per cent.	Pounds.	Quarts.
12	1½	5½	35	7	6½
15	3	8½	40	2	1½
18	4½	10½	50	2	1
24	6	9½	60	6	2
28	7	9	64	16	4½

(Bulletin 839, U. S. Dept. of Agriculture.)

CANNING FRUITS WITHOUT SUGAR

All fruits can be canned successfully for future use for jelly making, pie filling, salad purposes, etc., without the use of sugar by simply adding hot water instead of hot sirups. It has been found practicable also with certain vegetables to substitute sugar for salt in the canning process, and then add other seasoning to taste when serving.

In canning fruit without sugar, can the product the day it is picked. Cull, stem, seed and clean fruit by placing in a strainer and pouring cold water over it. Pack the product carefully in hot jars until full. Use tablespoon, wooden ladle, or table knife for packing purposes. Pour boiling hot water over the product in the hot jar. Place rubbers and caps in position, not tight. Place product in the canner and sterilize 30 minutes. Remove the filled containers. Seal jars, invert to cool and test joints. Wrap in paper to prevent bleaching and store in a cool, dry place.

CLASSIFICATION OF FRUITS

Fruits may be divided into two classes—soft fruits and hard fruits. The soft fruits include cherries, blackberries, blueberries, huckleberries, dewberries, raspberries, strawberries, figs, grapes, apricots, peaches, plums, currants, gooseberries and cranberries.

The hard fruits include apples, pears, quinces, etc.

RECIPES

Soft Fruits: After hulling, stemming, seeding or skinning the fruit, place in a strainer and rinse with cold water. Pack from the strainer into hot jars without crushing, using a large spoon or ladle. Pour hot, thin sirup, previously prepared, over the fruit at once. Before packing the second jar, place rubber and cap in position. Partially tighten and sterilize for 16 minutes from the time the water boils. Remove from canner, tighten covers, invert to cool, and test joints. Wrap in paper to prevent bleaching and store.

Another recipe for strawberries:—Canned by this recipe, strawberries will not rise to the top of the sirup. Use only fresh, ripe, firm and sound berries. Prepare them and add 8 ounces of sugar and 2 tablespoonfuls of water to each quart of berries. Boil slowly for 15 minutes in an enameled or acid-proof kettle. Allow the berries to cool and remain several hours or overnight in the covered kettle. Pack the cold berries in hot glass jars. Put the rubbers and caps of the jars in position, but not tight. Sterilize for 8 minutes. Remove the jars, tighten the covers, invert the jars to cool, and test joints. Wrap with paper to prevent bleaching, and store.

Use a medium thin sirup for gooseberries, currants, cranberries and sour cherries.

Hard Fruits: Apples, pears, and quinces: Remove skin and core. Cut into convenient slices or sections and drop into slightly salted cold water to keep from tarnishing. Blanch 1½ minutes. Cold-dip. Pack closely in hot jars. Fill with hot sirup. Put rubbers and caps of jars into position, not tight. Sterilize 20 minutes.

Remove from canner; tighten covers; invert to cool, and test joints. Wrap in paper to prevent bleaching, and store.

Windfall Apples: Separate apples into two grades: Whole and reasonably sound and firm, first grade; all other apples (bruised, worm-eaten, and those containing decayed spots), second grade.

Whole Apples, first grade: Pare and core. Drop whole apples in cold, slightly salted water, to keep from tarnishing. Pack whole apples in gallon tin cans or 2-quart hot glass jars. Add thin, hot sirup until full. Place rubbers and tops of jars in position, not tight. Sterilize 16 minutes.

Remove from canner; tighten covers; invert to cool, and test the joints. Wrap in paper to prevent bleaching, and store.

Apple-pie filling: The only difference between the canning of apples for pie filling and canning them whole as by the directions above is that the apples should be sliced immediately after paring into cold, slightly salted water. It will be found desirable to can first-grade apples either whole or quartered and second-grade apples

sliced for use for pie filling. Second-grade apples and products prepared from poor stock should not be sold, of course, without labels which make the grade plain. (U. S. Department of Agriculture, Bulletin 839.)

FRUIT JUICES

The fruit juice may be pressed out of fruit by means of a cider press, special fruit press, or other improved presses; then heated in an acid-proof kettle up to 110° F. The fruit juice may then be poured into ordinary hot jars, hot bottles, or tin cans, and handled by the same directions as those for canning of fruit itself. If poured into miscellaneous bottles, it is suggested that the fruit juice be sterilized as follows:

Make a cotton stopper and press into the neck of the bottle and leave during the sterilization period. Set bottles in boiling hot water up to the neck of the bottle, sterilize the fruit juice for 40 minutes at a temperature of 165° F. Remove the product, press cork in top over cotton stopper immediately. If the cork fits well, no paraffin need be used. If a poor cork, it may be necessary to dip the cork in a melted solution of wax or paraffin. Fruit juices and apple cider when handled in this way will not "flatten in taste" and will keep fresh for future use. (U. S. Department of Agriculture, Bulletin 839.)

Rhubarb: Wash and cut pie plant into lengths to fit the jars or into pieces of uniform size. Blanch for one minute then plunge into cold water. Place rubbers in position and fill the jars with rhubarb, packing as tight as possible. Make a sirup using one cup of sugar and three cups of water. When the sugar is completely dissolved and the sirup begins to boil, fill the jar with the boiling sirup. Adjust the tops and partially tighten. Sterilize 15 minutes. Remove from canner, tighten tops, invert and cool. Wrap in paper to prevent bleaching and store. (U. S. Department of Agriculture, Bulletin 839.)

PRESERVES

The cold-pack method of canning will be found especially helpful in eliminating the necessity of using paraffin or other wax tops for jellies, jams, and preserves. Three recipes and directions for canning jellies, jams, and preserves by this method follow to illustrate the application of the method. The use of containers with screw tops is recommended for these products. This will make unnecessary the expense and trouble of using paraffin, and will make the melting, molding, and deterioration of the top parts of the packs less likely.

Strawberry: Make a sirup of 1 quart of water and 11 pounds of sugar and cook it in an open kettle until the usual temperature for making candies, jellies, etc., is reached. If a candy thermometer is used cook the preserves until they reach a temperature of 265° F. A candy thermometer registers 265° F. when placed in the sirup. Add 8 pounds of berries to the sirup. Cook very slowly, just at the boiling point. Stop the cooking when the thermometer registers 219° F. and pour into shallow pans to cool. Hasten the cooling by pouring sirup over the berries. Skim while cooking. Fill into hot jars. Put the rubber and cap in position, not tight. Sterilize 20 minutes.

Remove the jars; tighten the covers; invert the jars to cool, and test the joint. Wrap the jars in paper to prevent bleaching.

Cherry: Place 1 gallon of cold water in a kettle and add 10 pounds of pitted cherries. After bringing to boiling point continue to boil slowly for 18 minutes. Add 12 pounds of granulated sugar and cook until after the mixture has boiled violently for a few minutes. If a candy thermometer is used cook the mixture until a temperature of 219° F. is reached. Pack into hot glass jars. Put the rubber and cap in position, not tight. Sterilize 20 minutes.

SUN PRESERVES

Strawberry: Select ripe, firm berries. Pick and preserve them the same day. Hull and rinse as on page 7. Place them in a shallow platter in a single layer; sprinkle sugar over them; pour over them 50° sirup (same as strawberry preserves, but boiled thicker). Cover them with a glass dish or a plain window glass. Allow them to stand in the hot sun 8 to 12 hours. Pack them in hot screw-top jelly glasses. Put the rubber and cap in position, not tight. Sterilize 20 minutes.

Remove the jars; tighten the covers; invert the jars to cool, and test the joint. Wrap the jars in paper to prevent bleaching.

VEGETABLES

Asparagus: Select asparagus stalks of uniform size, age and color. Scrub well with a vegetable brush. Cut off the woody parts of the stalks. Cut the stalks into long or short pieces of uniform length. Blanch from 3 to 5 minutes according to the age of the vegetable, and then plunge quickly into cold water. Place the rubbers in position and fill the jar with the asparagus, packing as closely as possible—with the tips up if whole stalks are used. Add a tablespoonful of salt to each quart of the vegetable and fill the jars with boiling water. Adjust tops and partially tighten the tops. Sterilize young, tender asparagus one hour and a half, mature asparagus two hours. Remove from canner, tighten tops, invert to cool and test joists, wrap in paper and store.

Beans, String and Wax: String. Blanch in live steam or boiling water, 5 to 10 minutes. Dip quickly in cold water. Pack in hot jars, with one level teaspoonful of salt to each quart. Add boiling water until jars are full. Adjust rubbers and caps. Sterilize for 2 hours. Remove from canner, tighten covers, invert to cool and test the joints. Wrap in paper and store.

Beets and Other Root Vegetables, such as carrots, parsnips, salsify, turnips and sweet potatoes: Grade for size, color, and degree of ripeness. Wash thoroughly, use vegetable brush. Scald or blanch in hot water sufficiently to loosen the skin. Dip quickly into cold water. Scrape or pare to remove skin. Pack whole vegetables, slices, or cross-section pieces in hot glass jars. Add boiling hot water until

full. Add level teaspoonful salt to quart. Place rubbers and tops of jars in position; partially seal, but not tight. Sterilize one hour and a half.

Remove jars from canner; tighten covers; invert to cool, and test joints. Wrap in paper and store.

How to prevent the fading of beets: Small beets that run 40 to the quart are the most suitable size for first-class packs. The older the beet the more chance there is for loss of color. When preparing the beet, leave on 1 inch of the stem and all of the tail while blanching. Blanch not more than 5 minutes, and cold-dip. The skin should be scraped from the beet, not peeled. Beets should be packed whole, if possible. Well-canned beets will show a slight loss of color when removed from the canner, but will brighten up in a few days. (U. S. Department of Agriculture, Bulletin 839.)

Cabbage and Brussel Sprouts same as string beans.

Cauliflower: Plunge flowered portion into cold brine, one-half pound of salt to 12 quarts of water. Allow it to remain in this brine for one hour. Blanch it 3 minutes and dip quickly into cold water. Pack in hot glass jars, fill with boiling water and add one teaspoonful of salt for each quart. Adjust lids and rubbers, not tight, and sterilize for 60 minutes. Remove from canner, tighten covers, invert, cool, wrap in paper and store.

Peas and Lima Beans: Blanch in live steam or boiling water, 5 minutes. Cold dip immediately. Pack in hot jars, and add one teaspoonful of salt to the quart. Adjust tops and rubbers, sterilize 3 hours. Remove from canner, tighten covers, invert, cool, wrap in paper and store.

Peas: A cloudy or hazy appearance of the liquid when peas are keeping well indicates that the product was roughly handled in blanching and cold-dipping, or that split or broken peas were not removed before packing. When peas are too old and blanching is not done carefully, the skin becomes cracked and the liquid cloudy. Some waters of high mineral content have a tendency to increase cloudiness also to harden the peas.

Pumpkin, Squash, Hominy, and Sauerkraut: Prepare and cut into convenient sections. Blanch 3 minutes. Cold-dip; pack closely in hot jars. Fill with boiling water. Add level teaspoonful salt per quart. Put rubbers and caps of jars into position, not tight. Sterilize 2 hours.

Tomatoes: Scald 1½ minutes or until skins loosen. Cold dip. Remove stems and cores. Pack directly into hot jars. Press down with tablespoon (add no water). Add level teaspoonful salt per quart. Put rubbers and caps of jars into position, not tight. Sterilize 22 minutes.

Sweet Peppers: Use sweet green peppers. Place the peppers in the oven and bake them until the skins separate from the meat. Remove the skins. Pack them solid in hot glass jars. Add water. Add 1 level teaspoonful of salt per quart. Put the rubbers and caps of jars in position, not tight. Sterilize one and one half hours.

Remove the jars; tighten the covers; invert the jars to cool, and test joints. Wrap the jars to prevent bleaching.

Corn, Field: Select corn between the milk and the dough stage. Use wide-mouthed jars. Avoid packing the containers too full as the product swells during the sterilization period. Can the same day as it is picked, if possible. Use a good grade of food chopper for grating the corn.

Blanch the ears in boiling water or live steam for 10 minutes. Remove and dip quickly in cold water. Cut the corn from the cob with a sharp, thin bladed knife. Grind to a pulp in the chopper. Add one level teaspoonful of salt to the quart, a little butter and a little sugar, and cook, stirring all the time until it becomes a thickened or pastelike mass. Then pack it immediately into hot glass jars to one-fourth inch from the top. Adjust tops and rubbers and sterilize for three hours. After this product has been sterilized, cooled and stored away, it will form a solid, butterlike mass, which when removed whole from the jar can be cut into convenient slices for toasting, frying and baking purposes or can be heated and used as a breakfast cereal. It makes a delicious, palatable, economical and nourishing food product.

Corn, Sweet: Select ears of the same variety and degree of ripeness, between the milk and the dough stage. Remove husk and silk. Blanch 5 minutes on cob. Cold-dip, cut corn from cobs, with a thin, sharp knife, and pack directly in jars to one-fourth of an inch from the top. If corn is to be canned on the cob, fill the jars with the ears, alternating tips and butts. Add a teaspoonful of salt to each quart and fill jars with boiling water. Adjust lids and rubbers, and sterilize for three hours.

Greens or Potherbs: A large number of cultivated and wild greens are edible, and if canned by this method will make a succulent and valuable food for the winter and spring months. Among the cultivated greens are Swiss chard, kale, Chinese cabbage leaves, upland cress, French endive, cabbage sprouts, turnip tops, young, tender New Zealand spinach, beet tops, dandelion, young, tender dasheen sprouts, native mustard, Russian mustard, collards, and tender rape leaves. Among the wild greens and pepper cress, lamb's quarter, sour dock, smartweed, sprouts, purslane, or "pusley," pokeweed sprouts, dandelion, marsh marigold, wild mustard, and milkweed (tender sprouts and young leaves).

Can greens the day they are picked. Wash clean, sort thoroughly, allowing no foreign weed leaves or other vegetable matter to remain. Rid the greens of all sand, dirt, dry, and decayed or diseased leaves. Place the greens in a crate or cheesecloth and blanch in live steam either in an improvised homemade steamer or regular steamer for 15 minutes. Remove the greens and plunge quickly into cold water. Place on the table and cut into convenient lengths. Pack tight in hot jars. Add hot water to fill the container and season to taste. The product will be slightly improved if a few strips of boiled bacon or chiped beef are added. A little olive oil also improves the flavor. If using glass jars, place rubbers and tops in position; partially seal. Sterilize 2 hours. Remove from canner; tighten covers of jars; invert to cool, and test the joints. Wrap in paper to prevent bleaching, and store.

BLANCHING, SCALDING AND STERILIZATION TABLE

(Circular No. 9, University of Missouri, College of Agriculture.)

Product	Blanch or Scald	Sterilize
	Minutes	Hours
Vegetables		
Asparagus	3—5	1½—2
Beans	5—8	2
Beets	6	2
Carrots	6—8	1½
Corn	8—15	3
Corn on cob	8—15	3
Eggplant	8—10	2
Greens	Until shrunk	1½
Okra	5—8	2
Parsnips	6—8	1½
Peas	5—8	2
Peppers	3	¼
Pumpkin	10	1
Rhubarb	1	¼
Squash	10	1
Sweet potatoes	6—8	1½
Tomatoes	1	⅓
Fruits		Minutes
Apples (whole)[2]		20
Apples (sliced)	1½	12
Apricots[2]		16
Berries		16
Cherries		16
Grapes		16
Peaches[2]		16
Pears[2]		30
Plums[2]		16
Quinces[2]	1½	30

[1]The time given as in the directions distributed through the circular is for quart jars. Add ten per cent. for half-gallon jars and deduct ten per cent, for pint jars. In all cases, the water must be boiling during the entire time given for sterilization. The time specified here and throughout this circular is that required if the water-bath method of canning is followed.

[2]Apples, apricots, peaches, pears, plums, and quinces may be blanched if desired. The average time required is from one to two minutes, depending on the firmness of the fruit.

HOME DRYING OF FRUITS AND VEGETABLES.

Drying, so common to our grandmothers and so unusual to us, has reached a high point of desirability this year. The continuously rising prices of jars and cans, and the huge demand for food abroad, the production of great quantities of perishable foods in home gardens tend to impress upon the housewife the desirability of preserving food, in this easy, cheap and effective manner. Small quantities can be dried at a time without much equipment, or the dirtying of many utensils. Not much space is needed for storage, there is no danger of freezing and the goods can be shipped easily. In addition, though the color and flavor may be altered, there is no change in the nutritive value of the food. Altogether, drying should become a popular art this year.

PRINCIPLES AND METHODS

There are three main ways of drying foods, sun drying, drying by artificial heat, and drying by air blast. These methods may of course be combined. Freshly cut fruits or vegetables should at first be exposed to gentle heat, and later to higher temperatures. Use a thermometer if you have one.

Most fruits or vegetables should be shredded or cut into slices, to be dried quickly. The time required for drying vegetables varies. The ability to judge accurately as to when the product has reached the proper condition for removal from the drier can be gained only by experience. It should be leathery and pliable, not so dry that it will crack or rattle, but too dry to exude water when pressed, and will not show any of the natural grain of the fruit on being broken.

It is advisable to "condition" all dried fruits and vegetables. This is best done in a small way by placing the material in boxes and pouring it from one box to the other once a day for three or four days to mix it thoroughly. If material is found too moist, it should be returned to the drying trays for a short drying.

PREPARATION OF FOOD FOR THE DRIER

Meat grinders, sauerkraut slicers, cabbage cutters or rotary slicers can be used or a sharp kitchen knife, when a handier cutting device is not available. Material should not be sliced too thin, from an eighth to a quarter of an inch is a fair thickness for most of the common vegetables.

Cleanliness is as necessary in the preparation of vegetables and fruits for drying as in their preparation for canning. Vegetables must be perfectly clean, young, tender and absolutely fresh. Steel knives used for cutting should be polished brightly. All root vegetables should be peeled.

Blanching of vegetables is desirable because it thoroughly cleans, removes the strong odor and flavor from certain kinds of vegetables, and softens and loosens the fibre. It also quickly coagulates the albuminous matter in the vegetables, which helps to hold the natural flavors. To blanch, plunge the vegetable into boiling water for a short time. Use a wire basket or cheesecloth bag for this. Drain well and remove the surface moisture by placing between two towels or by exposing to the air and sun for a short time.

DRYING APPARATUS

For sun drying, spread fruits or vegetables on sheets of paper or on old pieces of muslin. Choose bright, hot, sunny days for this work. Stir the product once or twice a day and remove thin pieces as they dry. Do not let rain or dew wet the product. Throw mosquito netting over the material to protect from dust and flies, and particularly from certain kinds of insects which habitually attack dried fruits and lay their eggs therein.

Large trays can also be used for sun drying, constructed so that they can be stacked on top of each other and protected from rain by oilcloth, canvas or roofing paper. Cheap trays can be made of lumber, 2 by 3 quarter inches, forming the sides and ends, with

laths for the bottom. Spaces, one-eighth of an inch should be left between the laths for ventilation, and lifts provided to raise the trays from the ground. Or substitute galvanized wire screen for the laths, one-eighth or ¼ (one-quarter inch) meshes.

For drying over the kitchen stove, make a series of trays, all one size, of laths or any wooden strips for the sides, and use screen wire, galvanized square mesh wire or cheesecloth to stretch across the bottom. Make an upright frame work, with cleats to hold each tray and suspend all by wires or rope over the stove. This drier can be made as large or as small as is desired, and can be used over the stove, on the back of the stove or in the oven. If desired, wire shelves may be tacked to the framework itself and then be bent up on the edges to form trays.

A more elaborate drier of the same design can be made of galvanized iron and steel on a wooden frame work. Full directions for this will be found in U. S. Bulletin, No. 841.

Another home drier is the cookstove oven. Bits of food, especially sweet corn can be dried on plates in the oven or on the back of the stove and saved for winter use. If the oven is used, watch the temperature very carefully.

There are several commercial driers on the market, some based on the same principle as the boxlike variety containing trays which has been explained, and another one which consists of a shallow flat metal box filled with water and designed to rest upon the stove or be supported over a lamp.

An electric fan to facilitate drying can be used with any of the open tray driers. It should be placed close to the trays and they should not be filled so full that the air cannot pass through them freely. The fan method keeps the product cool while drying and therefore tends to retain color and eliminate spoilage.

DIRECTIONS FOR DRYING

Fruits

Cherries, currants, huckleberries, peaches and apples are the best for drying. Berries can be dried, but are apt to be seedy.

Cherries: Wash, remove surface moisture and spread cherries, unseeded, in thin layers on trays. If cherries are seeded, there will be a loss of juice. Dry from 2 to 4 hours at 110 to 150 F. Raise temperature gradually. "Condition" by placing in boxes and pour from one to the other, once a day for three or four days.

Currants and Huckleberries: Pick over, stem, wash and dry all excess moisture with soft cheesecloth. Spread on trays, handle carefully and do not bruise. Spread thinly and dry slowly. Do not have high temperature or you will cook the fruit and lose the juice. Temperature should start at 110 F., rising slowly to 125 in two hours, finishing at 140 at 4 or 5 hours. Do not dry so hard that they rattle, but stop when the berries fail to stain the hand when pressed. "Condition."

Blackberries, Raspberries and Dewberries can all be dried by this method.

Peaches: It is better to peal peaches before drying. Remove stones, cut fruit in halves, and dry, pit side up, on trays. Dry at a low temperature 6 to 8 hours, or longer if necessary. Peaches must be "conditioned" and packed carefully. Do not use overripe peaches.

Plums and Apricots: Do not peel, but remove pits, cut fruit in halves and dry in the same way as peaches. Or the plums may be covered with boiling water and let stand for 20 minutes. Drain, remove surface moisture, and dry 4 to 6 hours in a slowly rising temperature. Select medium-ripe, thick-fleshed varieties.

Apples, Pears and Quinces: Tart winter apples are best for this purpose. Peel, core, and cut into eighths, slices, or rings, one-eighth of an inch thick. Dip immediately for one minute in weak salt solution—1 tablespoonful of salt to one gallon of water—to prevent discoloration. Remove surplus moisture and dry slowly at 110 F. to 150 F., raising the temperature gradually. Dry 4 to 6 hours and longer if necessary until they are tough and leathery.

Pears may be dried in the same way as apples or they can be steamed 10 minutes before drying.

Quinces are treated in the same way as pears.

Pack and "condition" as before described.

Vegetables

Beans: String or snap beans can be dried but must be in perfect condition, fresh, crisp and tender. Wash, remove stem, tip, and "strings". Break or cut into pieces ½ to 1 inch long, place on trays and dry. Or they can be strung on coarse, strong thread into "necklaces" and hung over the stove or out-doors. Remove strings, tips, etc., before threading. Another method is to blanch the beans in a wire basket or cheesecloth bag after they have been washed, "strung" and cut into inch pieces. Leave in the boiling water 6 to 10 minutes according to the maturity of the bean. Add one-half teaspoonful of soda to each gallon of boiling water to set the color of the bean. Remove surface moisture with a towel or piece of cheesecloth. Dry 2 to 3 hours in a slowly increasing temperature, 110 to 145 F.

Wax Beans—same as string beans.

"Condition" all beans.

Beans, Lima: Shell young lima beans, wash and blanch 5 to 10 minutes, depending on size and maturity. Remove surface moisture and dry from 3 to 3½ hours at the same temperature as string beans. "Condition."

Beans, Dry Shelled: After the beans have matured and dried on the vines, they may be shelled, washed, spread on the trays and heat 10 minutes, raising temperature 160 to 180 F., to destroy all insect eggs. Cool and store carefully. These beans cannot be used for seed as the heat has destroyed the vitality.

Beets: Wash young tender beets, peel, slice about one-eighth inch thick, and dry. Or the whole beets can be boiled with the skin until three-fourths done. Dip into cold water, peel and slice into one-fourth or one-eighth inch slices and dry 2½ to 3 hours at 110 to 150 F. "Condition."

Cabbage: Remove all loose, outside leaves of hard heads of cabbage. Quarter the heads, remove woody core, slice the remainder and dry, or blanch 10 minutes if desired. "Condition."

Carrots: Do not use carrots with a large woody core. Wash, peel, slice lengthwise into pieces one-eighth inch thick and dry. Or blanch 6 minutes after slicing and dry at 110, increasing temperature to 150 F. "Condition."

Greens, such as beet tops and celery: Select beet tops and wash carefully, cut leaf stalk and blade into one-fourth inch pieces and dry on trays. Dry celery in the same way. "Condition."

Onions: Select mature onions and remove outside papery coverings. Slice into one-eighth inch pieces and dry quickly. Or they may be blanching in boiling water 5 minutes after slicing. Remove surface moisture and dry slowly, 110 to 140 F. Store in a light-proof container to avoid discoloration. "Condition."

Peas: Shell and spread on trays to dry. Or full-grown peas may be shelled and blanched 3 to 5 minutes, then dried with towels, spread in single layers on trays and dried at 110, raising temperature very gradually for 3 to 3½ hours to 145 F. "Condition."

Large peas may be passed through a meat grinder, spread on trays and dried quickly for soups.

Very young and tender peas may be dried with the pods like beans, but it is not necessary to use soda.

Peppers: Slowly bake peppers in the oven or steam them until the skin peels, then skin, split in half, take out seed and dry slowly 110 increasing to 140 F. Or they can be dried in the sun with or without splitting, according to size. Small peppers are dried whole and can be strung on thread. Dry very small peppers by hanging up the entire plant.

Potatoes, White: Simply peel, slice into one-eighth inch slices and dry, or peel boiled or steamed potatoes, which are not quite done, and then cut into one-fourth inch slices or shred in a meat grinder or potato rice. Dry on a tray until brittle. Potatoes should be peeled, and may be toasted in the oven after drying to improve the flavor. "Condition."

Potatoes, Sweet: Treat the same as white potatoes, or they may be dried without cooking, dipping in salt water before placing on the trays. "Condition."

Pumpkins and Squash: Cut sound, well-grown specimens into strips and peel. Remove seeds and soft parts. Cut strips into smaller bits one-fourth inch by two inches long, and dry. Or cut into one-half inch strips and blanch for three minutes, then remove surface moisture and dry slowly for 3 or 4 hours at 110 to 140 F. "Condition."

Cauliflower: Divide in small bunches, blanch 6 minutes and dry at 110 to 145 F. Handle brussels sprouts in the same way, but add a pinch of soda to the blanching water. "Condition."

DIRECTIONS FOR PACKING AND STORING

Be careful of exposure to rain or dew on sun-dried products. Also cover with mosquito netting to prevent flies or other insects settling on the products and laying their eggs therein. As a precaution,

heat sun-dried products in the oven to 140 long enough to allow the heat to penetrate throughout. Immediately after cooling, pack the product promptly in tight paper sacks or bags, twisting the necks of the bags, then doubling them down and tying tightly. Tin cans, glass jars and patented paraffin cartons are all good receptacles for dried fruits and vegetables, but the paper bags, tightly tied are as good as anything. They may be brushed with melted paraffin and may be stored in a tin container with a tight lid such as a lard can. Label or mark every bag with its contents.

Examine products 24 hours after packing to see whether they have sweated. In case they have, they must be further dried.

To use dried products, it is necessary to restore the water that has been evaporated from them, therefore soak for an extended period of time. Do not throw away the water in which the product has soaked for it contains valuable mineral salts. Cook the product in it.

Once soaked, fruits and vegetables can be cooked in almost any of the ways fresh ones are cooked.